REMARKS

Applicant respectfully requests reconsideration of the rejection of claims 1, 2, 5, 15, 18, 28, 29 and 30 as amended without the addition of new matter. The following discussion will follow the numerical sequence presented starting on p. 3 of the Office Action of May 5, 2003.

SPECIFICATION

The specification has been amended at several points to clarify the trademark status of the term "SEALLUBE". Amendments have also been made, without new matter, for editorial purposes or clarity at a few points in both the specification and claims.

INFORMATION DISCLOSURE STATEMENT

In response to the Examiner's request set forth at page 2, paragraph 2 of the Office Action of May 8, 2003, there are submitted herewith copies of the two publications that were submitted with the Information Disclosure Statement filed December 21, 2001.

Claim Objections

Claim 1 was objected to because of an inappropriate reference to insertion of both male and female threaded sections in the coupler, and this has been corrected as requested.

Claim Rejections 35 USC § 112

Para. 7 of the Office Action rejected claims 18, 28, 29 and 30 under § 112.

Claims 18 and 28 were rejected as indefinite because of included references to "API standards" and "manufacturer's specifications", on the basis that these industry standards are used in the claim as a limitation. Claim 18 has not been amended in this respect, because the reference to "API or manufacturer's" specification is not a limitation, but is used instead to establish an understandable standard in the context for this highly specific art. Furthermore, references to API specifications can be found in many other patents and articles, as should be expected since API standards have been in use since approximately 1926. See, for example, the reference to API standards through the Sandia and Takacs article submitted herewith as replacements for the original submission under an Information Disclosure Statement. Existence and constant use over 75 years in the same basic form, should be enough, applicant submits, to justify such a reference to a type of sucker rod. Nonetheless, to advance the prosecution, claim 28 has been amended to refer to the statement in the Takacs book (pp. 56) as API specification for sucker rods, API Spec. 11B, 21st Ed., (Dallas, American Petroleum Institute, 1988). The Office Action further requests that a copy (or excerpts) of the API standard, should be submitted by an Information Disclosure Statement. Two extracted pages are being submitted with the concurrently filed Supplemental Information Disclosure Statement.

Claims 18, 28, 29 and 30 were rejected for the use of allegedly inconsistent language as to compression in the end regions of the coupling coextensive with the pin neck region and tension in the center region of the coupling coextensive with the torque disk. It was questioned how a rigid body can be in compression and tension at the same time in different axial regions. Reference should be made to p. 55 (Fig. 3-28) of the Takacs book which shows opposite stress conditions at two different axial sections of the same sucker rod. In this figure of Takacs, the coupling is under compression adjacent the ends and under tension in the center portion. Fig. 3 of the present application shows that controlled engagement of the pin ends of a coupling in accordance with the invention creates compression in the central region while the pin neck region remains in tension because of forces between the threshold area and the rod shoulder. Consequently, the claims are correct as stated and are submitted not to require any amendment.

Claim Rejections – 35 USC § 103

In Para. 9 of the Office Action claims 1, 2, 5, 15, 18, 28, 29 and 30 were rejected as unpatentable under 35 USC § 103(a) over Palone 3,859,503 in view of McCullough 1,851,714. It is respectfully submitted that these patents, individually and in any combination, do not teach the subject matter being claimed, that they contain no showing or suggestion that their teachings could be combined and that in any event they are inadequate for disclosing the combination and for attaining the results taught by applicant.

We will only briefly repeat some of the discussion concerning Palone in applicant's response to the prior Office Action. Specifically, Palone teaches only a

special type of sucker rod for heating a well bore so that thick oil being pumped can be kept liquefied. He teaches nothing whatsoever about the problems confronted by applicant, as to withstanding the stresses and mechanical forces exerted on the string so as to increase life and reliability. Palone cannot be construed to have any reference to structural operative properties, because of the special changes in his sucker rod design needed for his particular purposes.

In Palone, the sucker rods are hollow and contain a central electrical conductor member extending internally between the opposite ends within a central bore hole. The electrical resistance element 46 runs along inside the rods, to central insulator members 52 at each rod end. These members 52 provide electrical continuity, but only via small central projections 50 which provide circuit continuity between the resistance elements 46 within adjacent rods. This arrangement is suitable only for maintaining electrical contact, not for receiving, distributing or withstanding any of the very substantial forces of tension and compression that exist along the central axis of the sucker rod when it is in operation. It is per se evident, therefore, that this electrical heating arrangement is also unsuitable for increasing sucker rod lifetimes in use by rearrangement or redistribution of forces. The Palone concept is in fact unsuitable for any other use than the heating application. Palone thus clearly teaches away from any combinations which could improve operational life and stress-bearing capability.

The Office Action does not confront this disparity between what applicant claims and what Palone teaches but merely recites basic characteristics of an API sucker rod connection in terms of the threaded sections of pin ends and couplers and the overall geometry. Little can be controversial about the first part of Para. 9a of the Office action,

for example, but that paragraph is in error when it thereafter seeks to delineate how the references anticipate the distinguishing portion of the inventive combination of claim 1 as to engagement of opposing surfaces and buildup of stresses. In Palone, for example, the pin ends 44 of the sucker rods 36 do not include coupler end engagement members. Even though the pin ends are flat in Palone they are still spaced apart and unstressed when at full penetration in the coupler. Electrical point contact between opposing central projections 50 and the resistance elements 46 in the rods must be maintained, and Palone is totally silent on the subject of maintaining physical integrity during a long lifetime of use.

The Office Action seeks to fill this deficiency with a reference to the McCullough patent, and the length relationship between his coupler ends 34, 35 (Fig. 1) and a single double ended pin 36, (also best seen in Fig. 1). The argument contends that these length relationships provide compressional loading forces between opposing end forces of the coupler ends when the "male and female threaded sections are matingly inserted to preselected penetrations in the coupler ends 34, 35". However, this erroneously interprets the entire purpose and fundamentally different arrangement and effects used in McCullough. The difference should be viewed in terms of the separate approaches used in Fig. 3 of McCullough (treated by him as the prior art) and the preferred McCullough embodiment of Figs. 1 and 2. The prior art form of McCullough represents (see p. 2, lines 33-54) a specific and different type of sucker rod in which each rod has an internally threaded socket on <u>one</u> end and an externally threaded pin end on the <u>other.</u> This form has only a partial resemblance to an API structure, but is fundamentally different and would be unsuitable for use with or adaptation to the Palone

design. The preferred design of McCullough uses like sucker rods, each of which has an internally threaded and integral sleeve or socket 34 or 35 at each end. These rods are joined into a rod string by double ended and male threaded "pins" 36. These are regularly shaped as solid cylinders and are not be confused with the "pin ends" of current sucker rods, which reflects modern usage of the term "pin" for the male member (or rod) and the term "box" for the female member (coupling). These male threaded elements 36 are matingly inserted to preselected penetrations in the opposing sockets 30, 35 as seen in Figs. 4 and 5 of McCullough.

No end face contact is used or suggested, but the male pin 36 which is threaded into the female sockets 34, 35 has a "special thread" so that other factors in the design (e.g. p. 1, lines 21-26; p. 1 lines 82-93; p. 3 lines 126-129) create tension in each of the sockets and in the coupling as a whole. Because McCullough uses a "special thread" on the pin at each end which is slightly finer than the thread on the sockets, tension and compression are established within the thread regions themselves, promoting the desired locking action by compensating for pin stretching and compression of the sockets (p. 3 lines 126-129) while still permitting threading. Screwing the sucker rod sockets inwardly from opposite directions on the single pin 36 until the end faces of the sockets engage thus improves the locking of the threads and the loading of forces within this wholly different connection.

However, engagement of the penetrated end of the double ended pin within a socket in which it is received does not take place, see Figs. 5 and 6. Contact is made on one end of the pin 36 with a lock washer 37 in the socket 35 (Fig. 17), which merely serves to establish a differential between the engagement forces and the resistance of

the threads on the two sides of the double ended pin. Thus when the connection is disassembled, the pin remains in engagement with the one side because of the lock washer at that side.

Consequently, applicant respectfully traverses the contention that one with ordinary skill in the art would or could modify Palone by using dimensions which provide compressional load forces between opposing end faces of the pin ends "as taught by McCullough". It would be inconsistent in the Palone heating system to provide any type of compressional loading forces. There are no open "end faces" on the pin ends of the McCullough configuration because he uses only one pin, and it has to be spaced apart from the adjacent socket end face to avoid introducing interference by physical limits or extra stresses. Furthermore, the reduction of fatigue failure would not have been of any interest to Palone. A review of these two patents reveals no discussion of how the two different expedients of Palone and McCullough could be used with the same device. The two socket, single pin version of McCullough could not be combined with Palone, even if the "special thread" were to be eliminated.

With respect to claim 2, the same erroneous interpretation of Palone and McCullough is relied upon to assert that each pin end is penetrated to a chosen displacement, "beyond insertion to a hand tight plane". Again, there is no discussion in Palone of any further displacement beyond engagement of the shoulder against the coupling end at each side. Moreover, while sections of the pin end and the coextensive lengths of the coupler are prestressed in McCullough, this is due to the special thread configurations of McCullough on the double ended single pin that is used to introduce the localized compressions which inhibit relative movement. Accordingly, claim 2 is

submitted to distinguish over the references in the same manner as parent claim 1 and for its additional recitation of the hand tight plane relationship. This is significant because of its practicality in the fast and uniform makeup of successive couplings on the drill rig floor.

Relative to claim 5, the Office Action again relies on the combination of Palone and McCullough. It asserts that the "combination" includes a "torque washer 52 of a selected axial dimension..." It is respectfully submitted that there is no "combination" of Palone and McCullough which is feasible without numerous and ingenious modification of both references. These two dissimilar sucker rod connections cannot be treated as somehow unified so that different elements and relationships can be utilized gratuitously from each to supply a deficiency relative to applicant's claim.

In point of fact, actually all the elements cited in Para. 9c pertain only to Palone, and in this respect a number of liberties have been taken with the Palone teaching. There is no "torque washer 52" for example because, as stated in column 4, line 26 of Palone, that element is an "insulating member" and therefore it does not have "flat transverse sides", which are engaged on each side by "flat end faces" of the pin ends 44 as set out in claim 5. There is no such engagement, and no reason for any such engagement. There is instead only electrical contact in the center region and no load bearing relationship is established at the connection. Consequently claim 5 distinguishes for this reason as well as its parent claim.

The recitation of elements as to claim 15 on p. 7 of the Office Action, begins with a review of the elements of Palone, the initial portion of which review is again largely incontrovertible because it relates to the form and geometry of an API sucker rod.

However, the recitation of purported elements and relationships again becomes imprecise in finding a "torque element" of a selected axial length. Also, the end faces of the pin ends do not engage the "opposite end faces" of the end of the so-called "torque element 52" to stress at least portions of the main sections in compression. Again, only the limited region in the center, which is in alignment with the hollow central bore of the sucker rod, makes any contact and this only for electrical reasons. The asserted engagement in the coupler 40 "to a displacement past a high tight plane" in the Office action is again reiterated but again unjustified.

Accordingly, claim 15 is resubmitted without amendment for the substantive distinctions over the prior art already contained within it and the arguments presented above as to claims 1, et al.

Claim 18 was also rejected, essentially on the same basis, relying on an expansion of the teaching of Palone that is unsupported by McCullough. Again, the characterization of a torque disk as having parallel planar faces spaced apart by an axial distance and being of a different material than the pin ends is not shown or suggested in either Palone or McCullough. Neither reference contains an anticipatory teaching of the claimed feature of a selected axial distance between torque disk faces and the operative tightness achieved during thread makeup to provide the compression, tension, pressure and frictional contact needed to have superior coupling. On these features, the Patent Office takes the position that the precise planarity and flatness of the end faces of the pins are "within the scope of Palone's disclosure". This statement is respectfully traversed, because Palone not only says nothing of the sort but is indifferent to this dimension as long as there is no contact. It should be recognized that

the physical relationships and dimension set out in the claim represent a new combination, not merely "an optimization" in proportions. Given the objectives of the prior art systems, neither Palone nor McCullough would have had any concern or reason for using this particular dimension to have achieved a result inconsistent with their own teaching.

The rejections of parent claims 18 and 28 on the same basis as prior claim 15 are traversed on essentially the same grounds as recited above for claims 1 and 15, which grounds will not specifically be repeated here but which are incorporated by reference. The contention that an important deviation from a nominal end face plane is within the scope of McCullough's disclosure, is a gratuitous assertion without a showing or suggestion in McCullough as far as can be determined. Furthermore, McCullough does not appear to have any purpose to use such a feature. Accordingly claims 18 and 28 are resubmitted in their original prior form, with some editorial amendment solely to make the language more clear.

In claim 29 the Office Action recognizes that neither Palone nor McCullough specifies "how the sucker rod coupling will function under induced forces". This is treated as a "functional limitation" rather than a structural limitation. Such is not the case, however, because the geometry of the elements of the combination and their dynamic response to the high stresses induced, create the unified structure which is resistant to the minor displacements and deviations which, under multiple repetitions, induce the initially small displacements which give rise to fatigue failure. Given the severe bad requirements in this field, and the number of pump repetitions which are

utilized in a normal life cycle, it is inherent, as shown in the documents from Takacs and Sandia, that fatigue failures result from what are initially microscopic displacements.

Claim 30, dependent from claim 29 and expressing the concept of effectively unifying the multiple combined parts and the structure at the microstructure level, distinguishes as does parent claim 29 and for this additional reason.

In light of the above considerations, claims 1, 2, 4, 15, 18, 28-30 as amended are resubmitted.

Copies of the principal statements in the Information Disclosure Statement are resubmitted for the Patent Office files, as requested. Also attached is a partial extract from an API Standard, as requested. The additional patents cited to further show the state of the art have been examined and are not considered to apply.

Respectfully submitted,

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